
FINANCIAL COMPARISONS ACROSS DIFFERENT BUSINESS MODELS IN THE CANADIAN AIRLINE INDUSTRY

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ABSTRACT

This paper examines the accounting and stock price performance of two Canadian airlines, WestJet and Air Canada, over a five year period, taking into account the aftermath of the systemic shock to the airline industry produced by the September 11, 2001 (9-11), terrorist attacks and subsequent events such as the 2002 SARS outbreak, the wars in Afghanistan and Iraq, and the accompanying rise in jet fuel prices. Our study focuses on the viability of low-cost versus conventional-cost business models in Canada under the current business environment and the ability of airlines to withstand and effectively respond to catastrophic industry events. Furthermore, we link the effectiveness of the airlines' responses to these events to specific elements of their respective business models. We test our hypothesis through a case study. We focus on WestJet as a typical low-cost airline and compare its accounting and stock performance to Air Canada, a legacy carrier and rival in several business sectors. We find WestJet to be much less affected by catastrophic industry events. By decomposing each airline's return volatility, we observe that WestJet's systematic and unsystematic risk increased only slightly during the industry's post-9-11 turmoil when compared to Air Canada. In addition, we find that both WestJet's accounting and stock performance have been highly superior to those of Air Canada. We argue that WestJet's business model provides the firm with significantly more financial and operational flexibility than its legacy rival, Air Canada. WestJet's lower operating costs, high consumer trust, product offering, corporate structure, workforce and work practices, as well as operational procedures are all factors that appear to contribute to its relative success.

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INTRODUCTION

The extant aviation literature includes several studies that discuss the advantages and disadvantages of the distinct business models employed by low-cost and full-service carriers.¹ Earlier studies by Lawton (2002, 2003) discuss the strategies that both types of airlines have pursued in reaction to the September 11, 2001 (9-11) attacks and outline how those airlines have fared after 9-11. Although Lawton provides a brief review of the airlines' stock performance, his discussion is mostly qualitative in nature. Carter and Simkins (2004) provide a quantitative analysis of the stock performance of a sample of United States airlines to the events of 9-11, but do not focus on performance differences between low-cost versus full-service airlines. More recently, Flouris and Walker (2005a, 2005b) analyze performance differences between low-cost and full-service carriers in a risk-adjusted event study framework. All of these studies focus exclusively on the U.S. airline industry, however, and only consider the stock price performance of the sampled airlines. We add to the literature by providing the first comprehensive analysis of low-cost versus legacy carrier performance outside of the U.S. and by analyzing not only the stock price performance following such catastrophic events as 9-11 but also the impact of 9-11 and

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¹ In line with other authors, we also use the terms *legacy*, *conventional-cost*, *traditional-cost* or *full-fare* when referring to full-service carriers and *LCC* or *low-fare* when referring to low-cost carriers.

similar events on the accounting performance and risk profile, that is, the systematic and unsystematic return volatility, of the affected airlines. Our results are very consistent and provide interesting insights into the Canadian airline industry and into the differences between the two business models used by Air Canada and WestJet. In addition, our small sample size allows for a firm-by-firm discussion of special circumstances that affect each airline. These firm-specific discussions reveal several important facts that are usually not addressed in large-sample studies. As such, our approach is consistent with earlier studies by Bowen, Castanias, and Daley (1983), Hill and Schneeweis (1983), Shelor, Anderson, and Cross (1992), and Lamb (1995) who employ small sample studies to investigate the impact of an event or a series of events on a firm's performance and risk exposure.

Given the existence of varied regulatory frameworks across countries, a comprehensive large sample analysis of the performance differences between two business models is likely to yield biased and inconsistent results. Thus, we follow the extant literature and employ a case study in which we focus on a set of two airlines which, aside from their business model, are largely comparable. As such, our study is part of a series of similar case studies employing small sample comparisons of airlines in one country at a time.

Our methodological approach proceeds as follows. We first examine the short-term and long-term stock price performance as well as the accounting performance of WestJet and Air Canada during the post-9-11 period.² We then analyze how 9-11 impacted the risk, that is, the systematic and unsystematic volatility of the airlines' stock returns. We choose WestJet as a low-cost carrier representative and Air Canada as a firm that follows a full-service business model. These two airlines are the only firms in the Canadian airline industry that are publicly traded. As such, our paper is a complete account of the Canadian airline industry in terms of the firms for which stock price and accounting data are available.

When analyzing a firm's accounting performance around a particular event we can gain valuable insights into how the event impacted the firm's revenues, profitability, liquidity, as well as a variety of other performance measures. Because such an analysis only employs historical data, however,

² For brevity and expository convenience we will hereafter refer to the pre-9-11 and post-9-11 periods. It should be noted, however, that our study does not only consider the industry's reaction to the terrorist attacks of September 11, 2001. Rather, the post-9-11 period also includes such critical events as the 2002 SARS outbreak, the wars in Afghanistan and Iraq, and the accompanying rise in jet fuel prices. Thus, our study focuses not on a single event but on a series of events that have dramatically altered the industry landscape in recent years.

it provides little insight into the expected future performance of the firm. To examine the impact of a catastrophic industry event on the future prospects of our sample airlines we analyze their stock performance before and after the event. Because stock market participants base their valuation of a company's stock on the firm's expected future cash flows rather than on historical information, an event study of a firm's stock price performance reflects how the market as a whole anticipates the firm to do in the future. Lawton (2003) advances the argument that low-cost carriers were in a position to go on the offensive and aggressively exploit the changed industry climate after 9-11 by renegotiating labor contracts, by negotiating lower prices for new airplanes in what had suddenly become a buyer's market for new aircraft, and by pursuing aggressive pricing strategies to increase their market share relative to legacy carriers. Legacy carriers, being exposed to a significantly higher overhead burden, were forced into defensive strategies that provided them with little operational flexibility. These developments are difficult to observe in the airlines' accounting figures in the short term but—if they are perceived to change a firm's future cash flows—should be reflected in the market's valuation of the firm's stock.

When investigating the impact of catastrophic industry events on each airline's risk, we consider both the systematic and unsystematic volatility of the stocks' returns. This allows us to differentiate between risk factors that affected the market as a whole and risk factors that affected the firms specifically.

Although we employ only a small sample, our results are highly consistent.³ We observe that WestJet performed significantly better after 9-11 than its mainstream competitor in almost all aspects of accounting performance. During 2001, arguably one of the worst years in global aviation history, WestJet remained profitable. Only three airlines in the U.S. (JetBlue, Southwest, and Air Tran⁴) and a handful globally were also profitable in 2001. In 2002, WestJet continued to fare better than its full-service competitor. In addition, its stock held up significantly better than the

³ Note that with a bigger sample, one could perform a regression analysis of the airlines' accounting performance and abnormal returns after 9-11 on a variety of firm characteristics. This would allow for a more exact measurement of how each aspect of a firm's operations contributes to its success or failure. Unfortunately, such an analysis is not possible given that there are not enough low-cost and conventional-cost carriers in either the U.S. or Canada to form a broad enough sample that would allow for such an analysis. Thus, our analysis focuses on examining a small sample of airlines that have clearly different business models but are otherwise comparable with respect to size and pre-9-11 performance.

⁴ These airlines also follow different variations of a low-cost business model.

stock of Air Canada and showed a significantly smaller increase in unsystematic risk after 9-11. Our discussion elaborates on the qualitative aspects that sets these airlines apart and drives their performance differences.

Our findings provide empirical support for the qualitative discussion in Lawton (2003). In addition, they help explain the success of WestJet. We do not advocate that the low-cost model is uniform in the way it manifests in the market. Our argument is that the low-cost model, in its generic manifestation, can be differentiated from the full-service model along three management dimensions. They include adopting a viable strategic position, leveraging organizational capabilities, and reconceiving the value equation. These dimensions, coupled with the unique operational features that low-cost airlines have (pricing structure, fleet composition, route structure, choice of airports, distribution, and productivity) help explain, theoretically, why low-cost carriers are in the position to outperform their full-service rivals.

Zorn (2001) argues that low-cost carriers are more resilient than legacy carriers in times of economic downturn. Our analysis focusing on WestJet's performance validates this point, and Zorn's analysis helps us demonstrate it theoretically. Zorn cites several reasons for the resilience of low-cost carriers in times of recession: first, a lower overall and more variable cost structure; second, a lower breakeven load factor, and, third, business and leisure traveler migration from conventional-cost airlines to low-cost airlines. Our financial analysis substantiates this point to its fullest. We find that markets value low-cost airline stocks as growth stocks, whereas conventional-cost airline stocks are treated as cyclical.⁵ Even though affected, low-cost carriers emerged from 9-11 in a stronger market position than their full-fare rivals. Given the Canadian evidence provided by this study, as well as the results of earlier U.S. studies by Flouris and Walker (2005a, 2005b) and anecdotal evidence from various other countries, our findings can likely be extended to the global airline industry in that the low-cost model outperforms the legacy model across our study parameters in the way it responds to catastrophic industry events.

The paper is organized as follows. We begin with a brief description of WestJet's business model and compare it to the business model of Air Canada. We highlight several key aspects of WestJet's strategy, and make comparisons across carriers that are representative of the successful low-cost business model. The following sections provide a description of the data and explain the methodology used to test several hypotheses concerning the

⁵ Although we only report results for WestJet in this study, the accounting and stock price performance of other North American low-cost airlines such as Southwest, Air Tran and JetBlue in recent years was also remarkable relative to most other airlines in the region.

accounting and stock performance of our sample airlines. Results are presented. Findings are summarized in the final section.

THE LOW-COST BUSINESS MODEL

In this section we outline some of the common characteristics of the low-cost business model that WestJet and other LCCs such as easyJet, Ryanair, Southwest, JetBlue, and Air Tran have successfully employed in recent years. Researchers such as Lennane (2000) have documented several advantages of the low-cost business model. Our goal in this study is to examine how and why low-cost carriers outperform legacy carriers in times of crisis. While our empirical analysis focuses on WestJet, there is a large body of anecdotal evidence that suggests that other low-cost carriers—in several countries—have also fared significantly better after 9-11 than their full-service peers.⁶ There are many factors that set the low-cost business model apart from the full-service model. Although it is impossible to determine to what degree each factor contributes to the continued out-performance of low-cost carriers after catastrophic industry events, it is clear that the low-cost business model provides distinct advantages over the business model of full-service carriers in times of crisis. We first summarize some of our empirical findings and then discuss the main differentiating factors between the two business models as they relate to our study.

Our empirical analysis suggests that one of the primary factors that contributed to WestJet's superior stock performance was its superior ability to cover both short-term and long-term liabilities. As we will discuss in more detail below, WestJet not only had a higher current ratio, that is, a healthier proportion of current assets relative to current liabilities, immediately prior to 9-11 but also a lower debt ratio. Both factors likely put both bond and stock investors at ease as they could be somewhat confident that WestJet would not falter under the pressures that 9-11 put on the airline industry. In comparison, Air Canada had significantly fewer current assets on hand and was financially much more leveraged, which may have caused investors to shy away from it more quickly. WestJet also benefited from considerably healthier profitability ratios prior to 9-11, as reflected in a higher return on assets and net profit margin. Arguably, profitability is a good indicator of long-term liquidity. Thus, WestJet's higher profitability likely reduced the perceived default risk for the firm even further. Although WestJet already performed better pre-9-11 our results suggest that the performance gap widened even further afterwards. Naturally, the question arises about what may have caused WestJet's out-performance of Air Canada.

⁶ See, for example, Lawton (2003).

According to a Unisys Global Transportation report, “. . . the only prerequisite to economic success is to achieve a low cost base from which to build a desired service offering” (Unisys, 2003). This statement dismisses claims by full-service airlines that industry malaise is due to exogenous factors such as terrorist threats, rising oil prices, the wars in Afghanistan and Iraq, or SARS and is valid vis-à-vis the Canadian airline industry experience. Since Air Canada acquired Canadian Airlines, the integration of the two companies did not produce the cost savings expected. Despite having over 70% market share in Canada, the airline lost C\$82 million in 2000, the year before 9-11 happened.

Business models create a simplified description of the strategy of a profit-oriented enterprise. The low-cost airlines’ business model consists of a variety of characteristics, which includes price as its single most important product feature. In addition, most low-cost airlines are distinguishable from full-service carriers in terms of their product offering, corporate structure, workforce and work practices, and their operational procedures.

We argue that most of these factors can also explain why WestJet and other low-cost airlines have done so well during the recent industry crisis when compared to full-service carriers. The key qualitative factors that appear to set WestJet apart from legacy carriers such as Air Canada appear to be: (a) its focus on the core product (air transportation) without costly service offerings such as airport lounges, (b) the lower cost structure through the use of cheaper airports, online booking and a uniform fleet, (c) a lower and more flexible price structure, and (d) higher productivity through faster turnaround times and better use of its workforce.

By boosting the profitability of WestJet and by having positive effects on other measures of accounting performance, irrespective of the industry climate, these factors translate into good performance even during difficult times for the airline industry.

As our discussion points out, the full-service model employed by Air Canada, though reengineered after its emergence from bankruptcy protection in 2004, is still inherently inflexible (naturally) when confronted with sudden demand shocks and exposes the airlines to a significantly higher overhead burden that is difficult to cope with when unit sales, that is, bookings, drop. WestJet benefits from a lower overhead burden and more operational flexibility which allows it to weather difficult times better than its full-service competitor.

WestJet completed its initial public offering of 2.5 million common shares in July 1999 and transitioned to a public company. The capital raised from the offering was used for the purchase of additional aircraft, as well as the building of a new head office and hangar facilities in Calgary. In February of 2002, they offered an additional three million common shares yielding net proceeds of \$78.9 million. WestJet “celebrated its 27th quarter

of profitability with its third quarter 2003 results” (WestJet, 2007). The following sections explore the performance differences quantitatively, both from an accounting standpoint and from the stock market’s perspective.

DATA

We use accounting data from January 2000 to December 2003. We collected this data from year-end income statements and balance sheets, which are available online through Hoover’s Online database (www.hoovers.com).

For our analysis of relative stock performances pre- and post-9-11, we use daily price data (adjusted for dividends and stock splits) from January 1999 to April 2004, which we retrieved from the Center for Research in Security Prices at the University of Chicago Graduate School of Business (CRSP) database and the Toronto Stock Exchange (TSE).⁷ To measure market performance during our sample period, we use the TSE 300 market index. Finally, we use weekly data on annualized 3-month Treasury Bill yields as calculated by the Bank of Canada as a proxy for the risk-free interest rate during our sample period.

METHODOLOGY

Financial markets bring together potential investors who vote every day on the future profitability of the firm and the relative merits of managers’ strategic decisions. Simply put, if investors think that corporate decisions will lead to increases in long-run profitability, news of events such as a takeover will cause a firm’s stock price to rise. Conversely, news that investors believe will lower future profits will result in a fall in a firm’s equity value.

The finance literature refers to the idea that news is quickly impounded in security prices as the efficient market hypothesis, first described by Fama, Fisher, and Jensen (1969). The assumption that markets are efficient implies that security prices reflect all relevant information known to investors and thus provide us with the best estimate of a firm’s future profitability. There is significant empirical support for the efficient market hypothesis including the Carter and Simkins’ (2004) study of airline stocks following catastrophic events. We add to Carter and Simkins’ findings by focusing specifically on performance differences between low-cost and traditional-cost airlines. In addition, our study is the first to examine the accounting performance of

⁷ Note that our sample period is naturally truncated by the fact that Air Canada filed for bankruptcy protection on April 1, 2004. Thus, we restrict our analysis to the stock price and accounting performance prior to that date.

Canadian airlines post-9-11, and to examine how 9-11 influenced the systematic and unsystematic volatility of their returns.

If we assume that markets are efficient, and therefore set rational prices, we can measure whether the corporate strategy of a low-cost carrier such as WestJet, post-9-11, was in the best interest of shareholders by comparing the firm's profitability and stock price performance in the months after 9-11 to the performance of an airline that follows a conventional-cost business model (Air Canada).

Financial ratio analysis

To evaluate the accounting performance of our sample airlines we focus on examining some of the most frequently used financial ratios. Financial ratios can be grouped into four categories: (a) liquidity ratios, (b) activity ratios, (c) financing ratios, and (d) profitability ratios. Liquidity ratios provide measures of a company's ability to satisfy short-term obligations. Activity ratios measure a company's efficiency in managing its assets. Financing ratios provide some indication of the riskiness of a company with regard to paying its long-term debts. Finally, profitability ratios assist in evaluating various aspects of a company's profit-making activities.

It is important to remember that when using financial ratios to assess the overall financial stability of a company, more than one ratio should be considered when formulating an accurate opinion. For example, a company's solvency ratios may be ideal, but if the ratios that help analyze profitability and activity are bad (profits are down and sales are stagnant), a much different opinion would be formulated.

Our comparison employs both a cross-sectional and a time-series analysis. Cross-sectional analysis consists of comparing the financial ratios of different firms in the same industry at the same point in time. Time-series analysis consists of comparing the firms' accounting performance ratios over time.

Tyran (1986), Lev (1994) and Gibson (1997) describe a plethora of financial ratios that fall under the aforementioned categories. For brevity, we only report those ratios here that we feel to be most insightful.⁸ The

⁸ Note also that many ratios that are frequently used for manufacturing firms are of little importance in the airline industry. For this reason, we do not discuss such ratios as inventory turnover, accounts receivable turnover or accounts payable turnover. For the same reason, we do not differentiate between a firm's current ratio and acid test ratio. The acid test ratio is similar to the current ratio but eliminates the inventory figure in the current assets section of the balance sheet. Given that inventory is typically negligible for airlines this differentiation provides little additional insight.

following list outlines the calculation of each ratio and discusses their meaning.

Liquidity ratios

Current Ratio. The current ratio measures the ability of the firm to pay its current bills while still allowing for a safety margin above the required amount needed to pay current obligations. We calculate the current ratio as $\text{Current Ratio} = \text{Current Assets} / \text{Current Liabilities}$.

Activity ratios

Total Asset Turnover. The total asset turnover is a measure of how efficiently and effectively a company uses its assets to generate sales. The higher the total asset turnover ratio, the more efficiently a firm's assets have been used. We calculate the total asset turnover as $\text{Total Asset Turnover} = \text{Sales} / \text{Total Assets}$.

Financing ratios

Debt Ratio. This is a simple but effective ratio that indicates the firm's debt-paying ability in the long run. The ratio represents the percentage of assets financed by creditors, and helps to determine how well the creditors are protected in case of insolvency. The higher the ratio, the greater the degree of outside financing by creditors. A high debt ratio indicates that the firm is more leveraged (has more debt) and is risky for creditors. We calculate the debt ratio as $\text{Debt Ratio} = \text{Total Liabilities} / \text{Total Assets}$.

Interest Coverage Ratio. The interest coverage ratio (sometimes referred to as times interest earned) measures the ability of the firm to service all debts. The figure measures how many times interest payments could be made with a firm's earnings before interest expenses and taxes are paid. The higher the ratio, the more likely the firm can meet its obligations. We calculate the interest coverage ratio as $\text{Interest Coverage Ratio} = \text{Earnings Before Interest and Taxes (EBIT)} / \text{Interest}$.

Profitability ratios

Net Profit Margin. The net profit margin measures the amount of profits available to shareholders after interest and taxes have been deducted on the income statement. We calculate the net profit margin as $\text{Net Profit Margin} = \text{Net Income} / \text{Sales}$.

Return on Assets (ROA). The return on assets measures the firm's ability to utilize its assets to create profits by comparing profits with the assets that

generate profits. We calculate the return on assets as $ROA = \text{Net Income} / \text{Total Assets}$.

Return on Equity (ROE). The return on equity measures the return earned on the owners' equity in the firm. The higher the rate the better the firm has increased wealth to shareholders. We calculate the return on equity as $ROE = \text{Net Income} / \text{Stockholders' Equity}$.

Stock performance analysis

To examine the impact of 9-11 on the stock performance of our sample airlines, we follow the event study procedure described in Brown and Warner (1985), Peterson (1989), and Schweitzer (1989). Event study methodology measures the abnormal return of the stock, as the difference between the *actual return* and the *expected return*, around the time of the event. If an announcement such as news of increased profits is taken as good news, abnormal returns will be positive, signaling the market's belief that firm value has increased. A negative abnormal return is evidence of bad news, indicating that the market believes the event will decrease the firm's future profitability.

To estimate the abnormal return of a stock on day t , we subtract the expected return on the stock from its actual return on that day:

$$AR_t = r_t - E(r_t) \quad (1)$$

where AR_t is the abnormal stock return, r_t is the actual stock return, and $E(r_t)$ is the expected stock return, all on day t . In turn, we assume that the return of a stock is conditional on the return of the market and model $E(r_t)$ as:

$$E(r_t) = r_{f,t} + \beta_t [E(r_{m,t}) - r_{f,t}] \quad (2)$$

where $E(r_{m,t})$ is the expected return of the market on day t , $r_{f,t}$ represents the risk-free rate as measured by the return on 90-day Canadian Treasury Bills on day t , and β_t is the estimated slope coefficient from a linear regression of the stock's past returns on the returns of the market.⁹

⁹ Equation 2 is also called the capital asset pricing model (CAPM) and is based on Sharpe (1964) and Lintner (1965). In this paper, we estimate the capital asset pricing model using both 60 and 360 daily returns that precede our event window. We employ a linear market model that illustrates the relationship between an airline's stock return and the market (as proxied by the TSE 300 index) during a normal period.

We calculate daily abnormal returns for WestJet and Air Canada post-9-11.¹⁰ In addition, we measure cumulative abnormal returns, $CAR_{t,t+n}$, the sum of abnormal returns over a window of n days, as:

$$CAR_{t,t+n} = \sum_{i=t}^{t+n} AR_i \quad (3)$$

Cumulative abnormal returns enable us to measure the market's reaction to the performance of the airline in a time frame that encompasses the entire period from the event under study to the present.

Earlier industry research has largely focused on airline stock returns following a plane crash. Davidson, Chandy, and Cross (1987), Lin, Thiengtham, and Walker (2005), and Pukthuanthong, Thiengtham, and Walker (2007) find statistically significant negative returns for airlines on the day of the crash. This appears to be a short-term effect, however, and is reversed on the days following the event. Chance and Ferris (1987) examine 46 plane crashes, and discover that in 29 cases the carrier has a significant negative return. A crash does not appear to have an effect beyond the initial reaction, nor does it affect the stock price of the airline's competitors. Chance and Ferris also find a negative correlation between the airline's abnormal return and the number of fatalities in the crash.¹¹

More recently, Carter and Simkins (2004) investigated the stock market's reaction to 9-11. They note the potential psychological effects of the attack and test whether financial markets react rationally to news of the event. Carter and Simkins find that despite the psychological horrors the market was able to discern among airlines based on firm characteristics, including the ability to cover short-term obligations. Their results support rational pricing and have important implications for our work.

To serve as a further control in estimating the market's reaction to 9-11, our analysis compares the abnormal returns of WestJet's stock to the abnormal returns of Air Canada. We choose WestJet because it uses a low-cost business model, and Air Canada because it uses a conventional-cost model and has done so quite successfully. These firms should provide a good benchmark for examining industry reaction to the set of relevant

¹⁰ Because Canadian stock markets were closed following 9-11 and did not reopen until September 13, 2001, we define September 13, 2001, as the first day of our post-9-11 event window.

¹¹ Other studies that examine the consequences of airplane accidents for airlines include Borenstein and Zimmerman (1988), Mitchell and Maloney (1989), and Bosch, Eckard, and Singal (1998).

events. We do not consider CanJet and JetsGo¹² because they are not publicly traded and Air Trans since it derives a significant portion of its revenues from chartered flights.

Adjusting for risk

In considering risk changes, we calculate beta, the part of a firm's risk that is related to changes in the market. It is a measure of systematic risk, the risk that investors must be compensated for, and, thus, is related to a firm's cost of capital. If 9-11 led to the airline industry being a more risky business, we would expect airlines' betas to increase after 9-11. An airline's beta, β_i , can be found by regressing the airline's daily stock returns against the daily stock returns on the market as in the following regression model:

$$r_i = \alpha + \beta_i r_m + e_i \quad (4)$$

where α is the intercept, β_i is the slope coefficient that represents the sensitivity of the stock's returns to the returns on the market, r_m , and e_i represents the firm-specific residual, that is, the part of a firm's return that cannot be captured by the regression model. An alternative method for calculating a firm's beta coefficient employs the following formula:

$$\beta_i = \text{cov}(r_i, r_m) / \sigma_m^2 \quad (5)$$

where $\text{cov}(r_i, r_m)$ is the covariance between firm i's returns and the returns on the market, and σ_m^2 is the variance of market returns. Both Equation 4 and Equation 5 will result in the same beta estimates and may be used interchangeably. We use beta coefficients to adjust the expected returns in our event study for risk as in Equation 2 and to distinguish between a firm's systematic and unsystematic return volatility as discussed below.

Cornell, Hirshleifer, and James (1997) review many of the practical issues in beta selection and the application of regression-based asset-pricing models to estimating equity cost of capital. They provide assistance for resolving many of the conventional problems with beta estimation, such as selection of the risk-free rate, the time period for estimation, and the inclusion or exclusion of dividends.

Corgel and Djoganopoulos (2000) perform direct statistical comparisons of beta estimates calculated by large financial data vendors such as Bloomberg, Compustat, Dow Jones, and Ibbotson. They find that the

¹² Both of these airlines have ceased operations since the first draft of this paper was written.

different procedures used by these commercial services produce the same results when simple tests of differences of means are used to evaluate them. They observe that most data vendors use ordinary least squares (OLS) regressions of the returns of the firm against those of the market, where the security's return serves as the dependent variable, and the independent variable is a user-selected index. They point out, however, that users of financial software packages typically have some flexibility and can select the time period for estimation, the market index against which they want to measure returns, the data frequency (daily, weekly, monthly, etc.), and whether they want to include dividends or not.

Because the finance literature is divided on the issue whether short-term or long-term estimates should be used in CAPM estimation, we use a rolling window of both 60 and 360 calendar day returns to calculate covariances and variances. Most authors and financial data vendors use long-term betas calculated over periods of three and more years, but given the rapidly changing environment for the airline industry, we found short-term estimates to be more appropriate.

Expected market returns: Historical versus prospective estimates

Before we can address the question of how we estimate expected market returns, we have to define the market. In his famous critique of CAPM testing, Richard Roll (1977) indicates that the market portfolio to be used in CAPM estimation should contain all financial and non-financial assets available to investors and states that an accurate test of the CAPM will never be possible because of this requirement.

Despite Roll's criticism, most authors and financial data services use only country-specific common stocks to proxy for the market portfolio and rely heavily on the TSE 300 to represent the Canadian market. We follow this approach and use the TSE 300 market index for calculating both our beta estimates and market returns.

When developing an estimate of the expected market return $[E(r_m)]$, one has to decide whether to use historical data, assuming that past performance is the best predictor of future performance, or make an attempt to forecast a return for the market, which would require an accurate estimate of future dividend growth. As with most other studies in this field, we do not consider ourselves wise enough to forecast future market returns, but rather rely on past returns as an estimate of future returns. Another question we had to address in our estimation was which time period to use to calculate past market returns. Given the fact that 9-11 occurred relatively recently and that our return data are thus limited, we decided to use the geometric average of market returns during the past 360 calendar days as an estimate of future market returns. To test the robustness of our results, we also calculated 60-

calendar-day returns, but arrived at the same conclusions as we did with our long-term estimates.

Systematic versus unsystematic volatility

The systematic risk of a security is that part of the total risk that is associated with the movements in the underlying market. The unsystematic risk of a company's stock is that part of total risk which is specific to that company. To examine the effect of 9-11 on both the systematic and unsystematic volatility of our sample firms, we partition the variance of a firm's stock returns (σ_i^2) into its two components, systematic variance ($\beta_i^2 \sigma_m^2$) and unsystematic variance ($\sigma_{e_i}^2$), based on the formula:

$$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_{e_i}^2 \quad (6)$$

where β_i and σ_m^2 are as defined above and $\sigma_{e_i}^2$ represents the variance of the error terms, e_i , in our regression model in Equation 4.

An important statistic that emerges from the regression is the coefficient of determination R squared (R^2). While the statistical explanation of the R^2 is that it provides a measure of the goodness of fit of the regression, the economic rationale is that it provides an estimate of the proportion of the risk of a firm that can be attributed to market risk. The balance ($1-R^2$) can then be attributed to firm-specific risk.

There are two additional alternatives for calculating the R^2 which we present here for completeness. One alternative illustrates the economic interpretability clearly:

$$R^2 = \frac{\beta_i^2 \sigma_m^2}{\sigma_i^2} \quad (7)$$

As we can observe, in this case the R^2 is simply calculated by dividing the systematic risk of a firm's returns by the total risk as calculated in Equation 6. The other alternative employs the correlation coefficient $\rho_{i,m}$ between firm i's returns and the returns on the market:

$$\rho_{i,m} = \frac{\text{cov}(r_i, r_m)}{\sigma_i \sigma_m} \quad (8)$$

where σ_i and σ_m represent the standard deviation of the returns for firm i and the market, respectively.

If we square the correlation coefficient $\rho_{i,m}$ we can observe that the term $\rho_{i,m}^2$ is equivalent to the R^2 . Again, all three approaches may be used interchangeably and yield the same results. As noted above, the R^2 and $(1-R^2)$ simply provide a proportional decomposition of a firm's total variance σ_i^2 into its two risk components, $\beta_i^2 \sigma_m^2$ and $\sigma_{e_i}^2$, and may be interpreted as percentage weights.

RESULTS

Accounting performance

The first part of our analysis focuses on the relative performance of WestJet and Air Canada from an accounting standpoint, by comparing various accounting measures and financial ratios for the two firms over time. An analysis of the stock performance and return volatility of the two airlines follows in the next section.

The accounting figures and financial ratios in the following table are based on year-end income statements and balance sheets from January 2000 to December 2003 that we retrieved from Hoover's Online database. As we can see, despite 9-11, WestJet managed to remain profitable on slightly declining sales, while Air Canada registered significant losses on falling revenues.

WestJet's current ratio is consistently above that of Air Canada and—despite a slight decline in 2001 and 2003—improves significantly in 2003.

Table 1. Selected Accounting Data and Financial Ratios for WestJet and Air Canada Airlines, 2000-2003

Time Period	2000	2001	2002	2003
Panel A: WestJet				
Total Revenue (C\$ Million)	332.5	478.4	680.0	859.6
Net Income (C\$ Million)	30.3	37.2	51.8	60.5
Current Ratio	1.0	0.9	0.8	1.2
Total Asset Turnover	1.0	1.2	0.9	0.6
Interest Coverage Ratio	18.9	12.5	12.8	4.9
Debt Ratio	46.3%	43.6%	54.6%	60.7%
Net Profit Margin	9.1%	7.8%	7.6%	7.0%
Return on Assets (ROA)	9.0%	9.4%	6.6%	4.1%
Return on Equity (ROE)	16.7%	16.7%	14.6%	10.4%
Panel B: Air Canada				
Total Revenue (C\$ Million)	9295.5	9,607.0	9,826.0	8,368.0
Net Income (C\$ Million)	(112.5)	(1,253.8)	(828.0)	(1,867.0)
Current Ratio	0.7	0.8	0.7	0.7
Total Asset Turnover	1.0	1.1	1.3	1.2
Interest Coverage Ratio	0.0	-2.6	-1.0	-6.8 *
Debt Ratio	102.2%	110.6%	130.9%	160.1%
Net Profit Margin	-1.2%	-13.1%	-8.4%	-22.3%
Return on Assets (ROA)	-1.2%	-14.1%	-11.2%	-27.0%
Return on Equity (ROE)	n.m.	n.m.	n.m.	n.m.

Note. n.m. = not meaningful

* As a result of its April 1, 2003, bankruptcy filing, Air Canada ceased to accrue interest on unsecured debt that is subject to compromise. While under creditor protection, Air Canada only reported interest expenses to the extent that they will be paid under the plan of arrangement or that it is probable that it will be an allowed claim. Approximately C\$179 million of interest expense on unsecured debt would have been recorded in addition to the C\$85 million on its income statement had the filings not occurred. We use the sum of these two numbers, that is, C\$264 million, to calculate the interest coverage ratio in 2003.

A comparison of the activity ratios shows that WestJet's asset turnover ratio weakens after the catastrophic industry events. This is not the case for Air Canada. A look at the financing ratios, however, points a very different picture for our sample airlines. Although WestJet's interest coverage ratio drops significantly during our sample period (from 18.9 in 2000 to 4.9 in 2003), the firm remains in a good position to cover its interest expenses. On the other hand, the impact of 9-11 on the interest coverage ratio of Air Canada is tremendous: the airline had interest coverage ratios below 1 throughout our sample period, indicating that they experienced significant difficulties in making their interest payments. This ultimately resulted in Air Canada's bankruptcy filing on April 1, 2003.

Even before 9-11, Air Canada had a significantly higher debt ratio than WestJet. In fact, throughout our sample period, Air Canada's debt ratio exceeds 100%, fueled by a deficit in its shareholder equity. The high leverage and the accompanying financial risk are likely to be one of the reasons for the quick deterioration of Air Canada's financial ratios. By 2003, the debt ratio of WestJet rose to 60.7% (from 46.3% in 2000). In comparison, Air Canada's shareholder's equity deficit grew so large that in 2003 its debt ratio exceeded 160%.

The profitability ratios (ROA, ROE and profit margin) of WestJet are comparatively healthy after 9-11, although they remain below the profitability levels that WestJet showed in 2000. In contrast, Air Canada shows very strong signs of weakening post-9-11.¹³

Overall, our financial ratio analysis paints a grim picture for Air Canada while we observe only a slight deterioration in the accounting performance for WestJet. In its 2002 annual report, Air Canada emphasizes cost-cutting as one of the primary goals for the near future. Because cost cutting measures and other managerial actions generally take some time to be reflected on a firm's financial statements, it is difficult to determine their success through a short-term financial ratio analysis. If investors perceive such actions to be effective, however, they will be reflected in the financial performance of the firm's stock. Since financial theory suggests that the price of a stock should be equal to the present value of all future dividends, a stock performance analysis generally provides a good insight into how the financial markets expect a firm to do in the future.

For firms entering bankruptcy protection, a stock price analysis also provides a reasonable estimate of the market's expectation about the future of the firm, that is, whether or not it can successfully emerge from the bankruptcy. Air Canada filed for bankruptcy protection on April 1, 2003.

¹³ Note that we do not report the return on equity (ROE) for Air Canada in Table 1. Given that Air Canada carries a deficit in shareholder equity on its balance sheet throughout our sample period, this ratio is not meaningful.

Thus stock prices after this date reflect investors' consensus estimate of a successful emergence from bankruptcy. Although the firm successfully renegotiated labor contracts and locked in new financing arrangements (including a new C\$850 million financing arrangement with Deutsche Bank and a C\$250 equity million infusion by Cerberus Capital Management), any hopes of a stock price recovery were tainted when Air Canada received court approval to have its stocks cancelled. The company emerged from bankruptcy protection on September 30, 2004, and ACE Holdings, the new parent firm of the airline, quickly gained investor interest, with its Class B shares trading at C\$35.75 at the end of December 2004—a premium of C\$15 above their offering price. Since then, the shares have traded largely sideways, closing at a price of C\$33.98 on January 31, 2007.

Stock performance and return volatility

In order to examine how the financial markets reacted to 9-11 and whether investors put more confidence into low-cost carriers such as WestJet than into airlines that follow a conventional-cost model such as Air Canada, we examine the stock price performance of the two airlines pre- and post-9-11. Table 2 presents quarterly and yearly returns for the airlines and the market as proxied by the TSE 300 index.

The data clearly show the impact of 9-11 on the airline industry and the market. We observe a highly negative return for the airlines and the market index during the third quarter of 2001, followed by several quarters of high volatility when compared to the pre-9-11 period. Air Canada's stock price declined by more than 58.3% in the third quarter of 2001, while WestJet's stock dropped to a much lesser extent (31.5%).

Since the returns in Table 2 are not adjusted for risk, we are not yet in a position to draw any conclusions about the significance of these performance differences. Before we can evaluate the impact of 9-11 on the risk-adjusted stock price performance of our sample airlines, we first examine how 9-11 impacted the airlines' beta coefficients and the systematic and unsystematic volatility of their returns.

Table 2. Quarterly and Yearly Return Data for WestJet and Air Canada Airlines, 1999-2004

Quarter	WestJet	Air Canada	Market Index
1999-Q1	N/A	8.94%	1.73%
1999-Q2	N/A	-7.46%	6.25%
1999-Q3	21.61% *	61.29%	-0.75%
1999-Q4	22.70%	9.00%	20.93%
1999 Total	22.16%	15.38%	6.72%
2000-Q1	18.02%	42.20%	12.46%
2000-Q2	53.37%	25.81%	7.75%
2000-Q3	4.44%	-22.56%	1.79%
2000-Q4	-1.06%	-9.27%	-13.92%
2000 Total	16.95%	5.88%	1.51%
2001-Q1	-20.43%	-42.34%	-14.84%
2001-Q2	31.62%	10.51%	1.69%
2001-Q3	-31.50%	-58.30%	-11.60%
2001-Q4	42.51%	37.91%	12.43%
2001 Total	0.55%	-22.20%	-3.68%
2002-Q1	25.16%	37.65%	2.12%
2002-Q2	-30.25%	2.03%	-8.99%
2002-Q3	-12.29%	-31.91%	-13.51%
2002-Q4	-11.26%	-1.04%	7.02%
2002 Total	-9.21%	-1.37%	-3.69%
2003-Q1	-2.79%	-55.79%	-4.10%
2003-Q2	1.78%	-36.19%	10.09%
2003-Q3	52.07%	-15.67%	6.27%
2003-Q4	17.08%	17.70%	10.78%
2003 Total	15.21%	-27.26%	5.59%
2004-Q1	-7.73%	-0.75%	4.44%

* Note that WestJet went public on July 13, 1999. Thus, our return calculations for the third quarter of 1999 are based on WestJet's price data after that date, excluding its initial public offering (IPO) under pricing return of 25%.

Risk analysis

To measure differences in risk levels between the airlines and examine how those risk levels changed after 9-11, we first calculate beta coefficients for the airlines pre-9-11 and post-9-11 following the regression model in Equation 2. The resulting beta estimates are presented in Table 3.

Undoubtedly, 9-11 had a significant impact on both the economy as a whole and the airline industry in particular. By differentiating between

systematic and unsystematic risk in Table 3 we can examine the impact of 9-11 on return volatility in more detail.¹⁴

Although Roll (1986) discusses the possibility that unsystematic volatility may be noise, or in his words “frenzy unrelated to concrete information” (p. 204), recent empirical evidence by Morck, Yeung and Yu (2000) and Durnev, Morck and Yeung (2004) provides support for the notion that firm-specific return variation gauges the extent to which information about a firm is quickly and accurately reflected in stock prices.

Table 3. Stock Return Volatility Pre- and Post-9-11 for WestJet and Air Canada Airlines, Estimated Over Periods of 60 and 360 Days

	WestJet	Air Canada	WestJet	Air Canada
	60 Calendar Days Pre-9-11		360 Calendar Days Pre-9-11	
Beta (β_i)	0.118	0.251	0.093	0.503
Total risk (σ_i^2)	6.76	6.25	6.71	10.45
Systematic risk ($\beta_i^2 \sigma_m^2$)	0.01	0.04	0.02	0.58
Unsystematic risk ($\sigma_{e_i}^2$)	6.75	6.21	6.69	9.87
Proportion of systematic risk ($\rho_{i,m}^2 = R^2$)	0.0013	0.0061	0.0029	0.0550
Proportion of unsystematic risk ($1 - R^2$)	0.9987	0.9939	0.9971	0.9450
	60 Calendar Days Post-9-11		360 Calendar Days Post-9-11	
Beta (β_i)	1.106	2.169	0.790	1.467
Total risk (σ_i^2)	19.72	102.05	9.99	36.86
Systematic risk ($\beta_i^2 \sigma_m^2$)	1.74	6.70	0.62	2.15
Unsystematic risk ($\sigma_{e_i}^2$)	17.98	95.35	9.36	34.71
Proportion of systematic risk ($\rho_{i,m}^2 = R^2$)	0.0883	0.0657	0.0625	0.0584
Proportion of unsystematic risk ($1 - R^2$)	0.9117	0.9343	0.9375	0.9416

¹⁴ Note that a recent study by Hilliard and Savickas (2002) proposes an alternative method for examining the impact of an event on a firm's unsystematic volatility. Preliminary tests on our sample suggested no significant quantitative or qualitative differences in the results under either method. For brevity, we limit our discussion to the method presented here.

Not surprisingly, we find that the beta coefficients of both airlines increased considerably after 9-11. During the 360 calendar days prior to 9-11, WestJet had a beta of 0.093, compared to a beta of 0.503 for Air Canada. When performing the same analysis for the 360-day period after 9-11, we observe that WestJet's beta increased to 0.79, while Air Canada had a post-9-11 beta of 1.47. The differences are even more extreme when decomposing the airlines' total return variation as in Equation 6. Here, we observe a significant increase in the total risk for each airline, especially for Air Canada. In addition, we observe that systematic risk accounts for a significantly larger proportion of total return variation in the post-9-11 period. For WestJet, the increase is particularly large, as the coefficient of determination, R^2 , rises more than twenty-fold (from 0.0029 during the 360 days prior to 9-11 to 0.0625 during the same period afterwards). For Air Canada, the increase in the systematic risk component is approximately 6.1%.

Overall, we observe that the return variability for Air Canada appears to be primarily driven by firm-specific, that is, unsystematic, risk factors. The returns for WestJet, on the other hand, appear to be more and more driven by market wide risk factors.

There are two conclusions that can be drawn from our volatility analysis. First, the betas of both sample airlines have increased significantly, and are particularly high for Air Canada. With a beta of 0.093 prior to 9-11, WestJet showed little dependency on the overall market. Even though its beta remains below 1, it is now much more affected by return fluctuations in the market. If the betas remain at these elevated levels and the CAPM holds, then we can expect both airlines to be significantly more sensitive to the overall market than prior to 9-11.

Second, although the total risk of each airline has increased significantly after 9-11, the proportion of systematic risk increased for both airlines, particularly for WestJet. This suggests that market volatility has a much bigger influence on the return of each airline and bodes well for poorly diversified investors or sector-specific funds as—according to the CAPM—they should get rewarded for a larger proportion of the total risk they bear.

Risk-adjusted stock performance

To calculate how the returns compare between the airlines after adjusting for risk, we employ event study methodology and calculate the risk-adjusted cumulative abnormal returns for each airline pre- and post-9-11 in a CAPM framework. We use 90-day treasury bill rates as a proxy for the risk-free rate and historical market returns based on 60 and 360 calendar days to forecast expected market returns. Table 4 presents non-risk-adjusted returns of the airlines for various time periods after 9-11.

We observe that both airlines were negatively impacted by 9-11, with Air Canada performing the worst, losing over 23% on the first trading day following 9-11 and over 78% during the following 30 months. In comparison, WestJet lost only 12% on the first trading day after 9-11 and actually gained 58% within 30 months after the event. Both airlines show a medium-term recovery three to six months after 9-11, followed by a repeated downturn after 18 months, from which Air Canada was never able to recover.

Table 4. Non-Risk-Adjusted Returns Following 9-11, for WestJet and Air Canada Airlines

Non-Risk-Adjusted Returns Following September 11, 2001			
Time Elapsed Since 9-11	WestJet	Air Canada	Market
1 Day *	-12.3%	-23.1%	-3.3%
1 Week	-22.9%	-33.6%	-5.9%
2 Weeks	-14.9%	-45.3%	-11.3%
1 Month	-2.9%	-64.1%	-3.9%
2 Months	12.5%	-41.9%	-1.6%
3 Months	24.7%	-22.2%	2.5%
6 Months	62.9%	2.5%	7.7%
1 Year	4.7%	-13.3%	-9.9%
18 Months	-8.6%	-55.6%	-14.3%
2 Years	41.9%	-78.9%	3.5%
30 Months	58.3%	-78.3%	19.1%

* Note that the Canadian markets were closed for two business days following September 11, 2001. Thus, we calculate 1-day performance as the return from the close of trading on September 10 to the close of trading on September 13, 2001.

Table 5 presents risk-adjusted returns following 9-11 using 60-day trailing betas and market risk premiums estimated using 60-day historical returns. Although negative in the short run, we find that the risk-adjusted cumulative abnormal returns (CARs) for WestJet are positive in the medium and long run (1 to 30 months after 9-11). Although Air Canada shows some positive CARs in the medium term (3 months to 1 year after 9-11), they become negative in the long run.

Table 5. Risk-Adjusted Returns Following 9-11 Using Short-Term Estimates, for WestJet and Air Canada Airlines

Risk-Adjusted Returns Following September 11, 2001 (Using 60-Day Trailing Betas and Market Risk Premiums Estimated Using 60-Day Historical Returns)		
Time Elapsed Since September 11, 2001	WestJet	Air Canada
1 Week	-24.48%	-34.86%
2 Weeks	-4.79%	-59.47%
1 Month	2.84%	-86.37%
2 Months	22.08%	-23.89%
3 Months	34.46%	13.77%
6 Months	73.60%	16.46%
1 Year	40.56%	20.84%
18 Months	35.27%	-17.43%
2 Years	73.99%	-58.80%
30 Months	64.40%	-65.00%

Table 6 presents a long-term approach for estimating the inputs in our CAPM model. Here, we calculate risk-adjusted returns by using 360-day trailing betas and market risk premiums based on 360-day historical returns.

Table 6. Risk-Adjusted Returns Following 9-11 Using Long-Term Estimates, for WestJet and Air Canada Airlines

Risk-Adjusted Returns Following September 11, 2001 (Using 360-Day Trailing Betas and Market Risk Premiums Estimated Using 360-Day Historical Returns)		
Time Elapsed Since September 11, 2001	WestJet	Air Canada
1 Week	-24.71%	-35.41%
2 Weeks	-5.58%	-61.91%
1 Month	1.04%	-89.91%
2 Months	17.42%	-29.56%
3 Months	28.97%	6.47%
6 Months	63.32%	35.27%
1 Year	27.24%	3.41%
18 Months	23.34%	-4.63%
2 Years	75.24%	-20.20%
30 Months	67.06%	-52.38%

The results are similar to those presented in Table 5: WestJet clearly outperforms Air Canada on a risk-adjusted basis after 9-11. It is noteworthy, however, that Air Canada's underperformance is somewhat tamed when we use long-term estimates in our calculations.

CONCLUSIONS

Notwithstanding the fact that WestJet has been an innovative operation and, as the numbers and our analysis shows, has been quite successful even during difficult times, will it be able to maintain its success in the future? Will customers continue to remain loyal? Will the firm prevail in case investor confidence if the aviation industry deteriorates even further? Will the firm prevail if serious safety concerns arise about its operation or the operation of low-cost carriers in general?

Besides WestJet in Canada, other low-cost airlines such as Virgin Blue in Australia, AirAsia in Malaysia and Thailand, RyanAir and easyJet in Europe, and JetBlue and Southwest in the U.S. have been similarly successful. In Canada, we may see the emergence of additional low-cost airlines. Also, legacy carriers such as Air Canada have worked very hard to reinvent themselves as low-cost airlines. Especially in North America, currently, the service offering of LCCs and legacy airlines is virtually identical in regard to their domestic service, with legacy airlines still offering an international and in some cases global network as a significant point of differentiation with LCCs that typically have limited or no international networks.

We explain WestJet's overall success from an operational standpoint. WestJet has a lower and more variable cost structure and a lower breakeven load factor, which allows it to react to a changing environment more quickly than conventional airlines. In addition, WestJet benefits from the migration of leisure and even business travelers from conventional-cost airlines to low-cost airlines. Our financial analysis substantiates these qualitative observations. Financial markets appear to have more confidence in the flexibility and continued growth potential of WestJet than its traditional-cost counterpart Air Canada (which is treated as cyclical). Even though affected, WestJet and similar low-cost carriers in the U.S. emerged from such crises as 9-11, the 2002 SARS outbreak, the wars in Afghanistan and Iraq, rising jet fuel prices, and temporary demand declines caused by heightened fear of additional terrorist attacks in a stronger market position than their conventional-cost rivals (see also Flouris & Walker, 2005a, 2005b). From a management standpoint, we believe that adopting a viable strategic position, leveraging organizational capabilities, and reconceiving the value equation are critical in defining the comparative advantage of low-cost carriers.

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